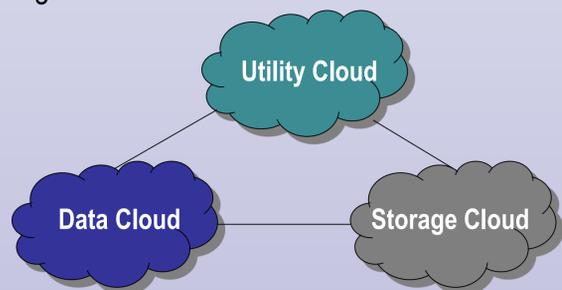


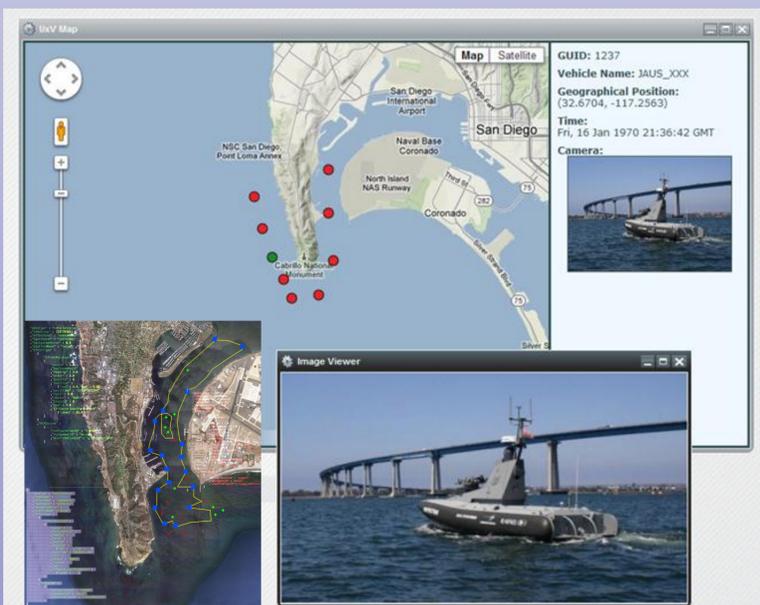
Cloud for Unmanned Vehicles and Widgets

Brief Overview

Unmanned Vehicles with multiple sensors output large quantities of data that need to be analyzed and stored. Three cross functional teams (Cloud, Unmanned Vehicles, and Widgets) are working together to provide analysis tools and storage capabilities for Unmanned Vehicle Data using the Cloud and Widgets.



Sample Widgets



Data Cloud

The Data Cloud is composed of Accumulo, which is a non-relational database. Accumulo is a sorted, distributed key/value store based on Google's Big Table. It was originally developed by the NSA, and is now available to the open source community. A major feature in Accumulo is that it allows for cell level control. Various users with distinct privileges will have different levels of access to the unmanned vehicle information.

How it works

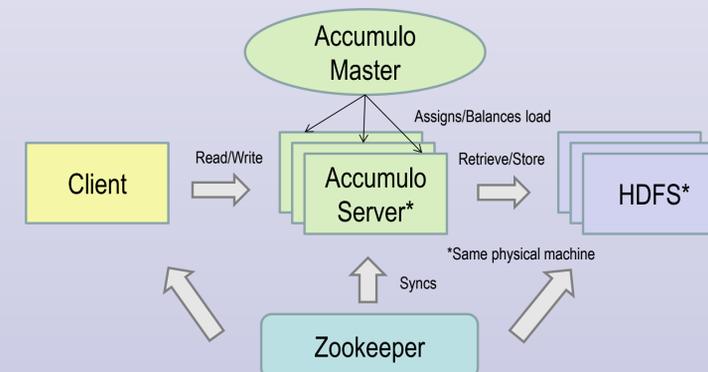
Accumulo is schema free. Columns can be created on the fly. This makes Accumulo ideal for large and sparse data. It's key consists of five elements: row id, column family, column qualifier, column visibility, and timestamp.

Key					Value
Row ID	Column			Timestamp	
	Family	Qualifier	Visibility		

Different combinations of the key can provide different levels of access and very flexible data tagging capabilities.

Row ID	JAUS777_1337703011						
Col. Family	waypoint		position		mission	pilot	platform
Col. Qualifier	current	next	lat	long	patrol_50	skipper	carrier3434
Value	A5	A6	1.235	-23.489	null	null	null

Accumulo in Action



Hadoop and Zookeeper

Accumulo utilizes the Hadoop File Storage System (HDFS) and Zookeeper service to store and coordinate data respectively.

Accumulo	
Hadoop HDFS	ZooKeeper
Stores Data	Does Synchronization

What I Learned and Future Plans

- Linux Operating System
- Virtual Machines
- Open source Cloud technologies: Accumulo, Hadoop, Zookeeper
- Microsoft Visio and Project
- Network Communications

I'm in the process of contributing to the Cloud team by installing and configuring Accumulo on another node for the Cloud cluster. This will further provide increased performance and redundancy for the system.